



NAVY DEPARTMENT

BUMED NEWS LETTER

a digest of timely information

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Carbon Tetrachloride Poisoning: Willcutts and Willhelmy (San Diego) report three cases of carbon tetrachloride poisoning, with two deaths. These cases came from a ship where a number of men were apparently as directly exposed to carbon tetrachloride fumes as were the three cases hospitalized. None but the three men hospitalized reported toxic symptoms. Death in the two fatal cases occurred with severe jaundice and findings indicating acute renal insufficiency. Autopsy showed diffuse fatty degenerative liver change; in one the damage was more markedly a central lobular change; both showed acute toxic renal damage (hepatico-renal syndrome). It was observed and emphasized in the report that in the two fatal cases carbon tetrachloride exposure had been preceded by a weekend of over-indulgence in alcohol.

It has long been known that carbon tetrachloride, though tolerated in minimal quantities in the form of vapor or as an anthelmintic, may be hepatotoxic in excessive amounts and that there are certain contraindications to its administration. One of these is recent alcoholism.

The vulnerability of a liver unprotected by an adequate store of glycogen is well known to surgeons. The hepatotoxic qualities of alcohol are also recognized, particularly under conditions of liver depletion. Work reported by Mann, Messinger and others forms the basis for a clear appreciation of many of the factors underlying liver susceptibility and portal cirrhosis, the injurious effect of fat, the protective value of protein and carbohydrate.

Hepatico-renal syndrome, described by Heyd and Furtwaengler, represents a type of acute liver death in which the liver may yield, when damaged, a substance which is highly toxic to both liver and kidney.

The cases reported emphasize the importance of (1) warning against the dangers of carbon tetrachloride; (2) hepatico-renal syndrome; (3) possible fatal synergism of alcohol and carbon tetrachloride.

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Observations on the Treatment of Battle Wounds Aboard a Hospital Ship. Conclusions based on an experience with more than 4,000 casualties handled aboard ship with a mortality of seven patients (0.18 per cent): Mechanical cleansing, local sulfathiazole, pressure dressing and immobilization have proved the most effective methods of wound treatment.

In chest wounds, treated conservatively, complications have been few and the mortality low. Tapping is performed in hemothorax and hemopneumothorax only for respiratory embarrassment or for diagnosis when infection is suspected.

In closure of the abdominal wall, when perforations of the colon have been sutured, it is suggested that muscle and fascial layers only be united.

Experience leads to the belief that conservative treatment deserves a fair trial in cases of suspected gas gangrene.

Policy has been to remove foreign bodies when they produce infection, when they lie in joints, or when they produce pain or other symptoms by pressing upon or involving vital structures.

Secondary hemorrhage is a constant threat for which adequate emergency treatment must be available. (Ferguson et al - U.S. Naval Med. Bull. Mar. '43.)

Note: With the local use of sulfonamides, radical debridement appears unnecessary and in many cases actually destructive.

In most cases early wound suture is not only unnecessary but is an actual hindrance to eventual wound healing. Wounds of the face and mouth are an exception to this rule.

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War Neurosis Regarded as Primarily Combat and Operational Fatigue: Combat and operational fatigue are more dynamically descriptive diagnoses of the early phase of what has been called War Neurosis. The syndrome is characterized early by a "startle reaction" - increased reaction to stimuli of all varieties; persistent anxiety with its physiological accompaniments - tremor, vasomotor instability, increased sweating; personality change - loss of interest, depression, irritability, lack of concentrating power; sleep disturbances - anxiety nightmares, insomnia, fatigability. This conditioned response to more than ordinary environmental stress has impressed all those reporting on this reaction process as being the nucleus of the disorder.

The therapy at this point is primarily sedation. The administration of barbiturates alone, throughout a twenty-four-hour period in quantities sufficient to control symptoms, decreases the morbidity by 40%. Sodium amyta .195 G (gr. III) every three or four hours during the waking hours and as much as .78 G (gr. XII) at bedtime have been shown to be effective.

The addition of reassuring psychotherapy reinforces this treatment and while these patients are in this phase of their response to physiological and psychological trauma increases the symptomatic remission rate to 75 per cent. (H.P.R.)

British Report on Tetanus: In the Lancet of December 26, 1942, Boyd and MacLennan report on tetanus in the Middle East: (1) That tetanus bacilli were found in 8.4 per cent of 214 wounds of a severe type; (2) that in the first two years of the War in the Middle East, 18 cases of tetanus were reported in the British fighting forces; (3) that of the 18 cases, 13 had not been previously immunized with toxoid, 5 had been actively immunized; (4) that of the non-immunized group, 6 had died; of the immunized group, 3 had died; (5) that among the immunized group dying of tetanus, one had only had two 1 cc. doses of toxoid six weeks apart and had not had the third booster dose usually given after a six months interval, while the other two appeared to have succumbed to overwhelming infection as the result of masses of necrotic tissue in their wounds; (6) that of the 5 immunized cases developing the disease, 4 had had only two doses of the toxoid, only one having had the full course of three doses.

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Certain observations may be made on the above report. One of the three immunized men who died of tetanus had not completed the three prescribed injections. The other two were overwhelmed with toxin from tetanus infection in masses of necrotic tissue.

To combat tetanus infection successfully in the toxoid-immunized patient, natural immunity must rise as stimulated by toxin production. When large masses of necrotic tissue are present, amounts of toxin may be produced which overwhelm rather than stimulate. Surgical removal, where possible, is of course indicated.

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British Scheme for Prophylaxis: The following extract from the London letter in the A.M.A. Journal of April 17, 1943, may explain to Naval medical officers some of the seeming contradictions in procedure which arise out of the differences, in the program for tetanus immunization, between the British and American forces. The voluntary and, therefore, incomplete coverage of the British force is one point of fundamental difference; the other is the British failure to adopt booster immunization injections of the tetanus toxoid.

"...The prophylactic scheme against tetanus differs in the British and American armies. The American army, like the Canadian, relies entirely on active immunization, while the British also uses passive immunization. The soldier gets a dose of toxoid on joining, a second dose about six weeks later and a further dose every twelve months. According to the ARMY MEDICAL BULLETIN (November 1942) this procedure sets up a 'shadow factory' for antitoxin and keeps it in commission but it does not maintain the circulating antitoxin at a constant high level. When tetanus organisms enter the body there may be a danger period of several days before the shadow factory begins to produce antitoxin in quantity, and it is necessary to protect the patient during this danger period by giving him antitoxin, at least 3,000 units as soon as possible after he is wounded. This routine passive immunization has the advantage that it covers any men who may have refused or escaped active immunization. But such men will require two extra doses of 3,000 units at weekly intervals to make them safe.

"In the American army active immunization is compulsory and is carried further. Not only does the recruit receive three spaced injections of toxoid but on entering a theater of war he has a fourth dose and renewal doses every four months thereafter. The American authorities believe that these inoculations maintain so high a level of circulating antitoxin that passive immunization after wounding is unnecessary. Instead of antitoxin, American soldiers are given a final "boosting" dose of toxoid.

"As in warfare American wounded may be brought to British hospitals and vice versa, the following arrangement has been made: The American authorities have asked that their soldiers should receive a boosting dose of toxoid instead of the British dose of antitoxin, and the Canadian authorities have made the same request. This will be done whenever possible. On the other hand the American authorities have agreed that British wounded in American hospitals shall receive prophylactic antitoxin."

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Jap Attitude "Correct" at 13 Prison Camps: War Secretary Sir James Grigg told the House of Commons yesterday that a report from an International Red Cross representative who visited six prisoner of war camps near Osaka and seven near Fukuoka indicated the Japanese had a "correct attitude" toward English and American prisoners.

He said quarters at the camps were clean and tidy, each camp had a prisoner of war doctor, with Japanese doctors also visiting; men were employed at various types of work for which they received pay, and officer prisoners received pay according to corresponding ranks in the Japanese Army. However, more clothing is needed, along with books, medical supplies and games. Food rations were reported "to be satisfactory in quality, but they are not very substantial and are not really of Japanese type." (AP - Apr. 7, '43.)

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Conversion Factors for Sulfonamides: With the continued introduction of new sulfonamide compounds for clinical use it is either necessary for the laboratory to have many standards for the estimation of the drug in the body fluids or to use a conversion factor. Since it may be impossible to obtain easily some of the sulfonamides in a chemically pure form, it is well to remember that the concentration of these drugs in body fluids can be determined, using any one of the drugs for a standard, if the result is multiplied by the proper conversion factor. Furthermore, it would be far more convenient for the laboratory technician to compare all his sulfonamides against one standard.

The accompanying table gives the conversion factors for some of the sulfonamides. Any of the various methods for the determination of the drug can be utilized. The unknown is compared to the standard and the result calculated to determine the quantity of drug per 100 cc. of blood or other body fluid. This result is then multiplied by the conversion factor.

Example: Using the method described in the Clinical Chemistry Manual (U.S.N.), the standard and unknown were diluted to 12.5 cc. With the standard set at 15, the unknown matched at 30.

Then using the formula:

$$(1) \frac{S}{U} \times \frac{0.05}{1} \times \frac{12.5}{12.5} \times \frac{100}{.5}$$

$$(2) \frac{15}{30} \times \frac{0.05}{1} \times \frac{12.5}{12.5} \times \frac{100}{.5} = \text{mg/100 cc.}$$

(3) Since the determination was for sulfathiazole compared to a sulfanilamide standard we use 1.48 for the conversion factor.

(4) Then $5 \times 1.48 = 7.40$ mgs. sulfathiazole per 100 cc. blood.

The use of conversion factors is not recommended for experimental studies, in which case it would be advisable to use the same sulfonamide in a chemically pure form for the standard as was administered to the patient. However, for routine clinical purposes very satisfactory results can be obtained employing these factors. Sulfasuxidine generally is not absorbed in the blood; however, the conversion factor is included in the accompanying table. (J.J.E.)

TABLE OF CONVERSION FACTORS FOR SULFONAMIDES

Drug Used As Standard	Drug to be Determined*						
	SULFA- NILAMIDE	SULFA- CETAMIDE	SULFA- NYLGUANIDINE	SULFA- PYRIDINE	SULFA- DIAZINE	SULFA- THIAZOLE	SULFA- SUXIDINE
Sulfanilamide	1.00	1.24	1.24	1.45	1.45	1.48	2.06
Sulfacetamide	.80	1.00	1.00	1.16	1.17	1.19	1.66
Sulfanylguanidine	.80	1.00	1.00	1.16	1.17	1.19	1.66
Sulfapyridine	.69	.86	.86	1.00	1.00	1.02	1.43
Sulfadiazine	.69	.86	.86	1.00	1.00	1.02	1.42
Sulfathiazole	.67	.84	.84	.98	.98	1.00	1.39
Sulfasuxidine	.48	.60	.60	.70	.70	.72	1.00

*The chemical determination is made as described by any of the various methods, and the final result (mgs. of sulfonamide per 100 cc.) is multiplied by the conversion factor obtained from the chart.

Loss of Hearing with Changes of Altitude: Rapid change from one altitude to another, without compensation of middle ear pressure, reduces auditory acuity in the frequency ranges which include the spoken voice and the radio beam so that, under operational conditions, reception of signals may at times be completely prevented. Therefore, conditions which may interfere with satisfactory readjustment of middle ear pressure, such as pharyngitis with accompanying eustachian salpingitis, are conditions of greatest importance in determining the flight efficiency of personnel whose auditory acuity, to mention only one important function, may mean success or even life for the whole crew. (R.B.B.)

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Preventing Crystallization of Sulfa Drugs in Urinary Tract: Fox, Jensen and Mudge report that they were able to give massive doses of sulfadiazine and maintain it in solution in the urine, provided they kept the urine strongly alkaline (pH of 7.5 or higher) by the use of 10 to 20 grams of sodium bicarbonate daily. They point out, however, that "when alkaline urine is voided with high concentrations of sulfadiazine in solution, decreasing the pH slightly (more acid) will immediately precipitate the drug." (J.A.M.A. Apr. 3, '43.)

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Peritoneal Response to Sulfonamides - Sulfathiazole Preferred:

Throckmorton reports as follows on the peritoneal response to crystalline sulfonamide compounds: (1) each of the sulfonamides produces some peritoneal response as shown by cellular changes in the peritoneal fluid; (2) sulfanilamide dissolves rapidly and gives a very slight peritoneal reaction; (3) sulfathiazole produces a vigorous, but not violent reaction; (4) sulfapyridine produces a violent peritoneal reaction, so violent as to result frequently in the walling off of the treated area from the general peritoneal cavity so rapidly as to reduce markedly even the bacteriostatic effect of the drug. The author views the effects of sulfathiazole as by far the most favorable, since this drug combines prolonged bacteriostatic action with the ability to enhance the local cytologic defense mechanism. (Surgery, Dec. '42.)

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Intravenous Migration of a Metallic Foreign Body: Siegling reports a case occurring rarely in civil life, of intravascular migration of a metallic foreign body. Because of the possibility of cases occurring in the armed forces, most of the literature on intravascular migration of projectiles is reviewed. It is evident that the final resting place and symptoms of a projectile penetrating a vascular channel depend on whether it perforated a vein or an artery. In the latter vessel the blood pressure is sufficient to overcome the weight of the metallic foreign body, whereas in veins the weight of the object overcomes the feeble pressure of the venous stream. (War Med. J. Mar. '43.)

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The editorial discussion of Meningococcal Infections, which follows, covers the subject so excellently that it is reprinted in full from the New England Journal of Medicine of March 11, 1943.

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Meningococcal Infections: Since cerebrospinal fever was first recognized in 1805 this disease has been known to occur almost constantly in a sporadic form and has assumed epidemic proportions at irregular intervals. It has flourished particularly during war time both in the military and in the civilian population. Unlike such diseases as influenza, the outbreaks of meningitis are not explosive in their appearance and do not affect a large number of people. Rather, they begin insidiously, usually increase gradually and persist for several months and often for years, but never have a high attack rate. In England during World War I there were 300 cases in 1914, 2343 cases in 1915, 1278 cases in 1916 and 1385 cases in 1917. The case fatality rate during these years averaged about 65 per cent. In the United States Army during these years there were 5939 cases, with a mortality of about 40 per cent.

The present war has seen an even greater increase in the number of cases of this disease in Britain, where a total of 12,500 cases occurred during 1940. There has also been a marked increase in the occurrence of this disease in Canada, as well as in New England and in neighboring states. Even greater numbers of cases are to be expected in the near future.

Compared with previous outbreaks, the present one shows several striking differences, which should be borne in mind in view of the serious attitude that health officers and the general population assume toward this disease. In addition to the low incidence of meningococcal meningitis both in the general population and among the military personnel, the case fatality rate is now surprisingly low. In Britain less than 10 per cent of all the cases occurring in the general population end fatally. In most large series of cases that have been reported, particularly those derived mainly from military sources, the mortality is more nearly 5 per cent. Young infants and aged persons still account for the greatest number of the deaths among civilians. In this country it is to be expected that less than 3 per cent of the cases occurring in army camps and less than 10 per cent of those occurring among the civil population will end fatally.

The great difference in mortality is, of course, due to the marked effectiveness of the sulfonamide drugs. Sulfadiazine is now usually recommended as the drug of choice but any of the other widely accepted sulfonamides, namely sulfanilamide, sulfapyridine and sulfathiazole, are also effective. For the most favorable results these drugs must be given as early as possible in the course of the infection. In severe cases, particularly those in which the patient is already stuporous or unconscious, the first doses of drug should be given parenterally. It may not be amiss, also to emphasize the importance of the administration of fluids early in such cases since the dehydration resulting from lack of fluid intake and from vomiting may predispose to renal complications if the sulfonamide derivatives are given intravenously. Early diagnosis and early and intensive treatment are therefore highly important.

Another encouraging feature of the cases that have occurred recently is the almost complete absence of serious crippling complications in patients who are properly treated. This is in striking contrast to the high incidence of total deafness and blindness among those who survived attacks of cerebro-spinal fever in previous outbreaks.

Finally, the present-day treatment is much simpler than before. (Dingle and Finland, War Med. 2:1-58, '42.) Lumbar puncture is now performed only for diagnosis or for the evaluation of the progress of therapy. Intraspinal injections of serum, with the severe complications resulting from their use, have now been completely and, it is hoped, permanently abandoned. Antimeningococcus serums, if given at all, are used only intravenously or intramuscularly in severe cases or when the disease fails to respond to chemotherapy alone. Most British physicians have completely abandoned the use of serums, but this may be due in large measure to expediency as well as to the excellent results obtained without them.

Several epidemiologic features are worth stressing. During periods when cases of meningococcal meningitis are prevalent there are numerous carriers of epidemic strains, particularly among the exposed population. In closed units, as in military barracks or even larger outfits, as many as 50 or even 75 per cent of persons may harbor meningococci in the nasopharynx without apparent infection. The factors underlying susceptibility to infection are not known.

There are, however, cases of meningococcemia without meningitis, which should be recognized and treated early since, if they remain untreated, the patients may develop meningitis. Such cases are, of course, most prevalent in epidemic periods. All persons having unexplained chills, petechial or purpuric rashes and joint pains or swellings accompanied by intermittent fever and headache should be suspected of having meningococcal infections. In some cases the symptoms are entirely respiratory and nowadays are likely to be attributed to atypical or virus pneumonia. Whenever possible, blood cultures should be made during the febrile phase and sulfonamide therapy should be given early.

During every epidemic there are a small percentage of severe and fulminating cases, usually with extensive purpuric eruptions. Some of these patients, today, fail to respond to intensive therapy. Such cases will probably comprise most of the deaths unless new methods are discovered for treating these patients more effectively.

With regard to prophylaxis, there seems little reason to advocate any large-scale adventures in this field. In small, compact and self-contained military units where action is anticipated soon after a case appears or after a large number of carriers are discovered it may be possible to eliminate the carrier state by a short course of sulfonamide therapy. Such a procedure at present is neither warranted nor feasible for large units of the population.

It is most important to emphasize the early recognition of cases of meningitis and of the various forms of meningococcal infection in the absence of meningitis and to treat such patients early. (N.E.Jour. Med. Mar. 11, '43.)

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Meningococcal Septicemia with a Malarial Type of Fever: Meningococcal septicemia occurred with a regular and intermittent type of fever suggestive of malaria and later joint pains suggestive of rheumatic fever. Treatment consisted of sodium salicylate 4-5 Gm. daily from the 13th through the 17th day and then 48.5 Gm. sulfadiazine throughout a week starting on the 23rd day of illness. Recovery was good despite delayed diagnosis. (Kilham, Lawrence Brit. Med. J. Dec. 12, 1942.)

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Prevalence of Meningococcus Meningitis in the United States During 1942 and First 9 Weeks of 1943: During the latter part of 1942 and the early weeks of 1943, the reported incidence of meningococcus meningitis has approached the epidemic proportions of 1929. In the early summer of 1942, in the weekly summaries of reports of the important communicable diseases published in the PUBLIC HEALTH REPORTS, attention was called to the fact that the incidence of the disease each week was exceeding the 5-year (1937-41) median. This excess incidence began during February and continued throughout the remainder of the year. In some of the weeks of November the numbers of reported cases were twice the 5-year median expectancy, in December they were about three times the median figures. In 1942 a total of 3,774 cases was reported in the United States. (These figures are based on the weekly telegraphic reports and are preliminary, but will probably closely approximate the final figures.) To March 13, 1943, a total of 4,040 cases has been reported.

The highest incidence rates so far this year have apparently been in New England, South Atlantic, and Pacific States. The largest number of cases are being reported from the South Atlantic, Middle Atlantic, Pacific, and New England areas. (Pub. Health Rep., Mar. 19, '43.)

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Waterhouse-Friderichsen Syndrome in Probable Meningococcemia: An interesting report from U.S. Naval Hospital, Sampson, N.Y. (Bailey) concerning the meningitis situation at that station has been received. Among 30 cases of meningitis there have been four in which the picture of fulminating purpura with hemorrhagic destruction of the adrenals has been evident. Three of these cases died quickly. In two of them the antemortem diagnosis of adrenal hemorrhage had been made. Autopsy showed bilateral massive adrenal hemorrhage. A fourth patient, with the picture of adrenal hemorrhage (cyanosis, dyspnea, low blood pressure, absent pulse, collapsed veins) superimposed upon that of purpuric meningococcemia has been under treatment for several days. The usual supportive measures have been supplemented by meningococcus antitoxin, sodium sulfadiazine, desoxycorticosterone and adrenal cortex extract. The incidence of purpura in this group has been, it seems, unusually high.

These four cases have been styled "presumed meningococcemia" as the bacteriological verification of the typical picture has not been obtained in all of them. The assumption of their character, however, seems to be well grounded. Other than in these fulminating cases, mortality has been nil. All have been treated with sulfadiazine. An occasional case has received antitoxin.

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Public Health Foreign Reports:

CHOLERA

Ceylon: During the week ended January 30, 1943, 24 cases of cholera with 22 deaths were reported in Ceylon.

PLAQUE

Madagascar: For the period January 11-21, 1943, 11 cases of plague with 10 deaths were reported in Madagascar.

SMALLPOX

Algeria: For the period February 1-10, 1943, 57 cases of smallpox were reported in Algeria, including 5 cases in Algiers, and 4 cases in Oran.

Indochina: For the period December 21-31, 1942, 72 cases of smallpox were reported in Indochina.

TYPHUS FEVER

Algeria: For the period February 1-10, 1943, 419 cases of typhus fever were reported in Algeria, including 11 cases in Algiers, 5 cases in Bone, 1 case in Mostaganem, and 23 cases in Oran.

Hungary: For the 2 weeks ended February 20, 1943, 25 cases of typhus fever were reported in Hungary.

Rumania: For the period February 16-28, 1943, 633 cases of typhus fever were reported in Rumania, as compared with 349 cases reported for the period February 2-15, 1943.

Slovakia: For the period January 24 to February 6, 1943, 15 cases of typhus fever were reported in Slovakia. (Pub. Health Rep., Mar. 19, '43.)

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The Relation Between Varicella and Herpes Zoster: Garland reports three cases of varicella following exposure to a case of herpes zoster. The relation between varicella and herpes zoster is discussed.

He notes that the proponents of the theory of a single, mutable virus for herpes zoster and varicella can present strong evidence to support their claims, even if exact proof is lacking. Thus the generalized eruption of herpes generalisatus, indistinguishable from varicella, assumes special interest as the best evidence available that the neurotropic virus of herpes zoster may also show definite dermatotropism.

He further notes that Zinsser, in developing the thesis that many examples exist in nature in which modifications of virus seem to have developed spontaneously, points to the relation between herpes zoster and chicken pox as a likely one, and Sabin, discussing the neurotropic virus diseases of man, alludes to the strong possibility that herpes zoster and varicella may be manifestations of the same virus. (N.E.J. Med. Mar. 18, '43.)

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Rocky Mountain Spotted Fever Prophylaxis: Frequent requests have been received by the Bureau for prophylactic vaccine for Rocky Mountain spotted fever. It is believed that it is impractical and unnecessary to attempt either widespread or local (camp or station) vaccination against spotted fever because of the very low incidence of the disease. This opinion is fully supported by the U. S. Public Health Service, which has pioneered in the study of the disease and has developed the vaccine.

A careful search for ticks and their prompt removal is one of the most practical and effective means of prophylaxis against spotted fever. For practical purposes, consider every tick as dangerous and remove it from the body as soon as possible.

If the infected tick feeds for a considerable period (six to eight hours or more), the virus then becomes activated and there is danger of acquiring spotted fever. However, if the tick is removed before attachment or very soon after feeding (two to four hours) the danger of infection is negligible. It should be noted that ticks habitually wander over the body for some time before selecting a site and attaching themselves. Persons exposed to ticks should be examined carefully at least once a day. All clothing should be removed, and all parts of the body, especially the hairy areas, carefully searched. Care should be taken not to crush the tick, for the blood and excreta may be infectious. The site of the tick bite should be painted with an antiseptic. (T.J.C.)

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Plasma or Albumin in Survivors: Shipwrecked survivors, as rescued, are dehydrated and in Negative Nitrogen Balance. Therefore, it has been suggested that, along with rehydration, plasma frequently may be indicated and that albumin is contraindicated.

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The Effect of External Temperature on Shock: The application of heat in the treatment of shock has been greatly stressed. Wakim and Gatch report their observations upon the effects of external temperatures in contact with control and experimentally shocked animals. Cold and heat proved to be deleterious to the life of animals in shock. An external temperature in the neighborhood of that of the mammalian body seemed optimal for the survival of shocked animals.

Among the physiologic mechanisms which nature calls into play to compensate for the decrease in blood volume during shock is an immediate generalized peripheral vasoconstriction which brings about a reduction in the capacity of the vascular tree. Such reflex vasoconstriction manifests itself in blanching of the skin and contributes to the sensation of cold experienced by the individual in shock. The patient is cold; we must apply heat, reason the overzealous and uninformed first-aid attendants.

Excessive heat produces a widespread superficial vasodilatation, thus distributing blood to nonessential parts and counteracting the protective natural reflexes.

Excessive heat therefore increases metabolism. Increased tissue demand for oxygen leads to a more severe anoxemia, increased capillary damage and capillary permeability. Loss of fluid from the vascular system and its accumulation in the tissues increases edema.

Excessive heat may increase perspiration and consequently promote dehydration. The promotion of dehydration in shock with pre-existing hemoconcentration and oligemia creates a vicious cycle, the outcome of which will result in greater hemoconcentration, oligemia and deeper shock.

It is clear then, that in shock, to conserve body heat rather than to add external heat is the wise course. It is better to err on the side of too little than too much heat.

The room of the shocked patient should be kept around 85° F.; the patient should be wrapped in blankets and kept comfortably warm. Until the lost circulatory volume is restored by plasma or whole blood, overheating will effectively counteract rather than aid nature's protective reflexes. (J.A.M.A. Mar. 20, '43.)

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The Choice of Anesthesia for Seriously Wounded Patients: In handling patients in shock, or in impending shock, anesthesia and operation are avoided whenever possible. Whenever anesthesia must be administered to severely wounded patients, local anesthesia is employed if considered adequate for the task at hand. For major surgical procedures intravenous barbiturate anesthesia appears to be preferable to chloroform when the use of a noninflammable, nonexplosive agent is imperative. Also, in conditions where local anesthesia will serve it is always to be considered. For major procedures inhalation anesthesia is generally preferable. Ether anesthesia is the best

all around single anesthetic agent for use when major surgery must be carried out. When great speed of induction and speed of recovery are of outstanding importance, cyclopropane or ethylene are chosen if available. Spinal anesthesia is poorly tolerated by severely wounded patients. Intravenous barbiturates are chiefly useful for producing general anesthesia for short procedures or as supplementary agents when local anesthesia proves to be inadequate. The final word on the best choice of anesthesia for various types of seriously wounded military patients has not been said and can only be spoken by trained observers under military conditions. (Beecher, J.A.M.A. Mar. 20, '43.)

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Gray Replaces Khaki Uniform: That a new working and fighting uniform for naval officers, steel-blue gray instead of khaki in color, has been officially adopted, was announced April 16th.

The change, made after months of experimentation, is the result of a long search for a color that is less conspicuous than khaki and provides better protection at sea.

Khaki blends well enough against the ground ashore but not with the "battleship gray" color of ships. The new color should make it more difficult for enemy planes to shoot down officers aboard ship in strafing attacks, it was said.

Specifications for a similar gray uniform for chief petty officers are in preparation, it was said. In addition, Secretary Knox said, study is being given to new work clothes for enlisted men, who now have dungarees of a grayish blue color.

Existing khaki uniforms now owned by officers or already made up in manufacturers' hands may be worn until the supply is exhausted.

The coat of the new uniform will be similar to the khaki except that the lower patch pockets will be smaller and the buttons will be of blue-black plastic. Shoulder marks will be of flexible material, slate gray in color with black braid and black embroidered insignia.

Articles making up the new work uniform will be: Coat and trousers, gray shirt with collar insignia, black tie, black shoes, black or gray socks, plain visored cap with black braid chin-strap and slate gray cap cover, and shoulder marks. Detailed specifications will be issued in the near future.

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Aerosols: The following is quoted from the report of Rockefeller Hospital Research Unit U.S.N.T.S., Bainbridge, Maryland:

"The total bacterial count of the air is an inefficient measure of the pollution of air, since most of these organisms are harmless saprophytes.

Serological Tests for Syphilis: Research indicates that serological activity in such tests is located in both the water-insoluble euglobulin and the water-soluble pseudoglobulin components. Work so far has been carried out on syphilitic sera only. Non-syphilitic sera which give false positive tests will be investigated. (Beard and Neurath.)

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"Prefabricated Eschar" or Bandage Containing Sulfonamide, for Treatment of Burns: Synthetic bandages prepared by drying sulfonamide - methyl cellulose (Methocel) solutions on fine meshed rayon, nylon, silk or veiling were found superior to other eschar substitutes without embedded fabric, in the treatment of extensive third-degree experimental burns in twenty rabbits. The prefabricated bandages did not dissolve; remained in situ for as long as three weeks without curling away from the burn; healthy granulation tissue formed without infections. A preformed sulfonamide, methyl cellulose film was discarded by Clark et al, in favor of the impregnated bandages, since the films without the fabrics tore easily when wet, dissolved rapidly on the wounds and were not flexible nor adherent. (Clark, William et al - Lancet, Dec. '42.)

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Human Red Cell Concentrate for Surgical Dressings: The authors report the use of red blood cells, ordinarily discarded after removal of plasma, as a surgical dressing in the treatment of burns, infections and ulceration. The red cells were applied as a thick coat of paint and resulted in a subsidence of purulent discharge, smooth healthy granulations, and an impervious coverage preventing fluid loss and re-infection. (Moorhead, Unger - Am. J. Surg., Jan. '43.)

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The Danger of Talcum in the Peritoneal Cavity: Talcum is predominantly magnesium silicate. It sets up a vicious reactionary adhesive peritonitis. Talcum gets into the abdominal cavity when shed from the surface of rubber gloves, or from cracks, or when it is spilled accidentally from inside the gloves. Seelig reports that experiments indicate that ordinary cornstarch serves as an ideal dusting powder, does not cause undesirable after-effects, and is sterilized by ordinary autoclaving. (J.A.M.A., Apr. 17, '43.)

* * * * *

Multiple Vitamins, an Inquiry and an Answer: A few weeks ago, NMSD, San Francisco, received a requisition from a certain organization for 15,000 bottles (1,500,000 tablets) of multiple vitamins - the explanation being that the organization desired to issue one (1) tablet daily to each man for the first 60 days in order to supplement the ration. In disapproving the requisition, BuMed commented as follows:

"If ration lacks essentials, report should be made to BuSandA with copy to BuMed." (Medical Supply News Letter No. 2-43.)

Pilonidal Cyst Surgery: Cyst teratoma, pilonidal cyst, pilonidal sinus and sacral dermoid are terms which, though not strictly synonymous, are used interchangeably. The lesion is congenital. Surgical intervention in this condition is often resorted to throughout the service. Men who, up to the time they enlisted, never were worried or bothered by a tiny sinus with exudate, now are transferred to the hospital for radical operative treatment. The wisdom of operating on all of these cases has been questioned. An analysis of the sick days in one series (G.E.T.) gives an average of 89 days on the average case. Attention is directed to the possibility that this very considerable period of hospitalization may not represent all sick days which may result from radical surgery. Such patients often return because of tender or painful scars, and occasionally for recurrences because of incomplete removal of epithelial rests. The decision as to the need of surgery, of course, rests with the surgeon handling each case.

Abscessed cases may be opened and drained and in a short time return to the pre-inflammatory state. Other cases without infection often have only occasional and minimal exudation. The presence of a small sacral teratomatous rest may be no more incapacitating for military service than it appears to have been for the man's peace-time activities.

* * * * *

Hemoglobin Regeneration With and Without Iron: To determine the average time required for hemoglobin to return to its original level in blood donors, Barer and Fowler gave iron salt to 89 donors after their second blood donation. The rate of hemoglobin regeneration was increased by 49 per cent. The recovery period was shortened to 35.2 days in comparison with 49.6 days required following the first donation without therapy. There was no evidence of bone marrow exhaustion after repeated donations. (Amer. J. Med. Sciences, Jan. '43.)

* * * * *

Recovery of Function After Nerve Injury: Gutmann and his colleagues from the Department of Zoology and Comparative Anatomy in Oxford say that a good test of the time and degree of functional regeneration of nerve is provided by a study of the function of spreading of the toes of the rabbit, following lesions of the peroneal nerve. They report that the circumference of the denervated muscle begins to increase, and its threshold to direct stimulation to decrease, before reflex function, sometimes before even indirect excitability return. Fibrillations continue in the muscles for about two weeks after reappearance of reflex function.

The normal weight of the muscle is nearly regained twelve weeks after re-appearance of reflex function following crushing of the peroneal nerve. Recovery in the autonomous zone of a nerve due to regeneration of the interrupted nerve proceeds in general in a downward direction. The nature of the lesion is of decisive importance for time and degree of recovery. Recovery after suturing is slower, more irregular, and definitely less than that after simple crushing. (J. Neurology & Psychiatry, July-Oct. '42.)

Yellow Fever Survey: Field work in yellow fever continued throughout the year in central Africa, in Brazil and Colombia in South America and in Central America. Blood specimens obtained from Indians in the inadequately explored area of eastern Panama showed clearly that yellow fever had very recently occurred there, and it is probably now present. The infected area does not reach the Canal Zone, but stops at about the level of Chepo. Similar investigations in western Panama failed to reveal any evidence that the disease had been present in recent years. Farther to the north, in forested areas on the border between Guatemala and Mexico, where conditions exist which might be favorable to jungle yellow fever, an investigation was carried out on horseback and by canoe. The field study in this area confirmed the earlier conclusions that yellow fever does not exist in Mexico or in Central America, except in that part of Panama nearest South America.

In Africa, field investigations in certain areas showed a high prevalence of Aedes aegypti, the mosquito which transmits yellow fever. As a precaution, mass vaccination of the population was undertaken by a staff member of the Foundation. The African situation is receiving increasing attention because of the potential danger of the spread of the disease in areas which are or may become military zones. (Rockefeller Foundation, Review for 1942.)

* * * * *

Immunization of Naval Personnel must be completed before transfer to sea duty: (a) Manual of Med. Dept. Par. 2301, 2605, and 2606. (b) BuM&S Form Letter P2-3/P3-1(121) dated Jan. 12, 1942. (c) BuM&S Form Letter P2-3/EN(054-40) dated March 4, 1943. Information is continually being received in the Bureau to the effect that men are being transferred to other stations without the required immunizations and without complete health records. This practice is resulting in unnecessary work and confusion at the receiving station.

In accordance with references (a), (b) and (c), it is necessary that all stations transferring personnel to other stations for further transfer to sea or over-sea duty insure the completion of required inoculations prior to departure of the men concerned.

All immunization procedures must be entered in the medical abstract (NMS Form H-3) of the health record and the health record properly completed at station of origin of each man assigned to a draft for sea or over-seas.

* * * * *

Venereal Disease Rates in the Navy, 1942: Venereal disease admissions in the Navy for 1942 show a drop of 29 per cent from the previous year, the Division of Preventive Medicine reports. The admission rate per thousand per annum for the entire Navy during 1942 stood at 36. In 1941 this rate was 51; in 1940 it was 80. The general rate has dropped more than half over these three years.

Admission rates for all Naval activities in the Continental United States show a similar downward trend. Rates were substantially below the entire Navy level, standing in 1940 at 40 per thousand; in 1941 at 29; and last year at 22. This rate is the lowest in the Navy's history and appears, at this time, to be below comparable Army figures.

Syphilis now accounts for about 9 per cent of all venereal disease, chancre for 8 per cent. Admissions have been reduced substantially. The syphilis rate is 3.3; the chancre, 3.0.

Gonorrhea rates have decreased, but the percentage of total venereal disease load due to gonorrhea has grown from 70 per cent in 1940 to 82 per cent last year. Admission rates for those two years were 57.5 and 29.4 respectively. (T.J.C.)

* * * * *

Sulfa Drugs in Dentistry: Although local application of a sulfa drug following a dental operation is now considered good practice, the operator should not depend wholly upon this method of minimizing infection. Aseptic technique, good operative procedures, careful debridement, irrigation and cleansing remain fundamentally important. Recent literature seems to bear out the fact that with the use of sulfanilamide or sulfathiazole added to the cardinal necessities mentioned above, one may expect decreased post-operative complications.

Regarding the choice of sulfa drug for dental use, it may be said that sulfathiazole is at present preferred for local use in oral surgery because of (a) its greater solubility; (b) wider bacteriostatic effect on the organisms which may be encountered; (c) good local phagocytic response; (d) less clumping in insoluble masses; (e) more prolonged effect.

The administration of the drug locally should receive careful consideration due to the fact that over packing of the wound will prevent normal healing. A well granulated form, rather than the powdered form which may cake, seems to give excellent results if applied sparingly. An ointment containing 10 to 40 per cent of the drug has shown superior results. The peculiar requirements of dental surgery necessitate tight suturing of the wound as a means of holding the ointment in place.

Routine application in all wounds of the oral tissues does not seem to be indicated as this procedure interferes with the formation of normal granulation. However, where infection is present or expected and tissue resistance is lowered, local sulfonamide therapy seems of value.

* * * * *

Women Doctors for Army, Navy: The act of Congress which provides for the appointment of women physicians in the Medical Corps of the Army and the Medical Corps of the Naval Reserve of the Navy has been signed by the President and is now effective.

The Bureau of Medicine and Surgery, Navy Department, is preparing to establish approximately six hundred billets for female physicians in the various Medical Department activities ashore, including foreign shore: 200 Lieutenant Commanders, Medical Corps, Volunteer, Special Service Class; 200 Lieutenants, Medical Corps, Volunteer, Special Service Class; 200 Lieutenants (junior grade), Medical Corps, Volunteer, General and Special Service Classes. Appointments will be made in rank commensurate with professional qualifications, age and academic seniority.

Requirements for appointment in the Medical Corps of the Naval Reserve for women physicians will be identical with those established for male candidates.

* * * * *

ALNAV #71, 14 April: Amendment to National Service Life Insurance Act provides that any person in active service (regardless of date of entry) shall be granted NSI without medical examination upon application therefor in writing made within 120 days from 12 April 1943 upon payment of the premiums. If application form is not available any statement in writing which identifies and is signed and dated by the applicant, witnessed by his commanding officer, showing the amount of insurance desired and accompanied by a remittance or proper authority for deduction from active service pay sufficient to cover the monthly premium on the amount of insurance applied for shall be considered an application. An application should show the effective date of the insurance and the names and relationship of the beneficiaries. To obtain immediate protection applicant should designate effective date as of the date of the application and register an NSI allotment designating as the month of first payment the month immediately preceding the month during which the insurance application is executed. All Navy personnel without maximum amount of National Service Life Insurance including persons whose applications have been rejected in the past are strongly urged to apply immediately for full amount allowed by law. Commanding officers, insurance officers, disbursing officers and all others are instructed to take prompt and effective measures to fully inform all naval personnel everywhere of the provisions of this amendatory act and of their right to promptly obtain this insurance. Frank Knox.

* * * * *

The following letters reprinted below are (a) of limited distribution, (b) have been or will be published in the Navy Department Semimonthly Bulletin (indicated by asterisk). The first date following the title in the paragraph below indicates date of release, the second indicates date of Navy Department Semimonthly Bulletin in which letter appeared:

1. Subject: Training of Pharmacist's Mates, March 13, '43.
2. Subject: Unauthorized Medical Experimentation on Service Personnel,* April 7, '43; April 15, '43.

3. Subject: Aviation Cadets, Class V-5, U.S.N.R. - Administration of medical matters pertaining to, April 3, '43.
4. Subject: Organization for Control of Malaria and Epidemic Diseases in Amphibious Combat Forces, March 19, '43.
5. Subject: Medical Care of U.S. Merchant Seamen Suffering as a Result of War Disasters*, March 16, '43; April 1, '43.
6. Subject: Pathological Material, Collection and Shipment of Specimens*, April 15, '43.

* * * * *

BUREAU OF MEDICINE AND SURGERY

Y:mlm

P11-1/MM(032)

March 13, 1943.

From: The Chief of the Bureau of Medicine and Surgery.
To: Commander in Chief, Atlantic Fleet.
Commander in Chief, Pacific Fleet.
Commanders, Submarines, Atlantic and Pacific Fleets.

Subject: Training of Pharmacist's Mates.

1. It is recommended that all Pharmacist's Mates attached to and serving on board submarines receive special instruction on the indications for and the technic of the administration of dried blood plasma, glucose solution, and normal saline solution.

2. The above items have been added to the Commissioning Outfits of Submarines and are being supplied as rapidly as possible.

ROSS T. MCINTIRE

STANDARD DISTRIBUTION: 1(a), (b), (c), (u), (w); 2(i), (j);
3(ff), (gg), (hh), (ii), (jj); 7(l).

Op13C-jc April 5
Serial No. 67913

April 7, 1943

From: The Secretary of the Navy.
To: All Ships and Stations.
Subject: Unauthorized Medical Experimentation on Service Personnel.

1. It has been noted with concern instances in which service personnel have been subjected to experimental procedures involving potent medication and often hazard to health or efficiency, the investigations in question being conducted by civilian physiologists, civilian physicians, or individual medical officers who may or may not be aware of all considerations pertaining to such investigation.

2. Experimental studies of medical nature upon service personnel are hereby forbidden except when the experimental design in each case has been duly submitted to the Bureau of Medicine and Surgery, for consideration and recommendation, and to the Secretary of the Navy via the Chief of Naval Personnel, the Commandant, Marine Corps, and the Commandant, U.S. Coast Guard for final approval.

FRANK KNOX

Distribution:
Lists 1, 2, 3, 4, 5, 6(for 8, 9a, b, c, 10), 7, 11, 13

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BUREAU OF MEDICINE AND SURGERY

AM:mlh

QR5/P11-1(084-40)

April 3, 1943

From: The Chief of the Bureau of Medicine and Surgery.
To: Officers in Charge, All Naval Aviation Cadet Selection Boards;
Commandants of Naval Districts.

Subject: Aviation Cadets, Class V-5, U.S.N.R. - Administration of medical matters pertaining to.

References: (a) Manual of the Medical Department. Par. 2301 (a), (b).
(b) BuM&S Form Letter No. 7-41. P2-3/EN(054) August 5, 1941.

1. References (a) and (b) direct that immunization procedures be entered in the Medical Abstract (NMS Form H-3) of the health record. It has come to the attention of this Bureau that in many instances this is not done when these immunization procedures are administered in the Flight Preparatory Schools and the C.A.A.-W.T.S. Training Schools. It is requested that addressees direct senior medical officers to take the necessary steps to insure these highly important entries be made in the health records of all men immunized against smallpox, typhoid fever, tetanus or other diseases.

2. Some misunderstanding apparently exists regarding the forwarding of records of aviation physical examinations (NMS Av. Form 1). It is the desire of this Bureau that the approved copy of this examination report be retained at the Naval Aviation Cadet Selection Board until such time as the cadet is transferred to the Pre-Flight School. It should then be forwarded to the Senior Medical Officer of the Pre-Flight School in time to arrive not later than the date on which the cadet reports at that school. Until further directed the approved copies of the NMS Aviation Form 1 of cadets transferred to Class V-12(a) will be retained by the Naval Aviation Cadet Selection Board until the individuals are ultimately returned to Class V-5.

3. It has been reported that in many instances facilities are not available for the typing of blood for naval aviation cadets in the early stages of the training program. In such circumstances this procedure may be deferred until the naval aviation cadets reach a point in the program where this can be accomplished by qualified naval personnel. Facilities for this work are available at the Pre-Flight Schools. If identification disks are issued before blood type has been determined this information may be added to the disk at a later date.

ROSS T. MCINTIRE

DISTRIBUTION LIST:

6 less (i), (m), (n),
and 10 (q).

March 19, 1943

From: The Secretary of the Navy.
To: Chiefs of Bureaus, Boards, and Offices, Navy Department
Commandant, Marine Corps
Commandant, Coast Guard
Fleet, Force, Type, and Sea Frontier Commanders
Squadron, Division, and Detachment Commanders
Marine Corps Activities

Subject: Organization for Control of Malaria and Epidemic Diseases in Amphibious Combat Forces.

1. Recent amphibious operations have been seriously handicapped by the large number of personnel incapacitated by reason of malaria, gastrointestinal disorders of a dysentery nature and other conditions peculiar to tropical climates. Up to the present time malaria has been, and probably will continue to be, the most serious problem encountered. Experience has shown that, under combat conditions, prevention and control of these diseases cannot be adequately solved by the regularly attached medical personnel whose entire facilities are required for the care of the sick and wounded.

2. For the purpose of reducing these disabilities to a minimum there is established, this date, as a part of each Marine Division, a Malaria and Epidemic Control Unit, which will function under the Division Surgeon. The work of these units will be directed by the Malaria and Epidemic Control Officer attached to the Staff of the Division Commander, who will be responsible for the prevention and control of malaria and other epidemic diseases that may threaten the division. To assist him in this work and under his immediate direction, there shall be two or more Malaria and Epidemic Control Teams, as needs require, consisting of officers and enlisted personnel who have been trained and equipped at the U.S. Naval Medical School. As needed, he shall also be assisted by the sanitary section of the accompanying Construction Battalion, the members of which have been carefully selected and designated for this work and given basic training in malaria control by Medical Department personnel.

3. The work of the various Malaria and Epidemic Control Units functioning in a given area will be supervised and coordinated by the Malaria Control Officer attached to the Staff of the Commander of the supporting Naval Force.

4. Cognizant bureaus and offices of the Navy Department, and the Commandant, Marine Corps, will consult with the Bureau of Medicine and Surgery immediately to effectuate the establishment of this organization. Unit Commanders are directed to afford malaria and epidemic control operations first priority during the period of planning and after arrival in the combat theatre in keeping with the military situation.

FRANK KNOX

From: The Chief of the Bureau of Medicine and Surgery.
To: All Ships and Stations.

A18-1/L16-9(023)
Ca-GJS
March 16, 1943.

Subject: MEDICAL CARE OF U.S. MERCHANT SEAMEN Suffering
as a Result of War Disasters.

References: (a) Article 685, N.R.
(b) Section IV, Chapter 6, M.M.D.
(c) BuM&S letters, dated April 7, 1942, and July 8, 1942.

1. It has come to the attention of the Bureau that medical officers of the armed forces of the United States in some cases have been in doubt as to the availability of their services for treatment of merchant seamen brought ashore in foreign ports suffering as a result of war disasters. Attention is invited to references (a) and (b), which contain all the authority necessary for medical officers of the Navy to render assistance and use Government facilities and materials in emergencies for the care and treatment of persons not in the naval service when other adequate facilities are not available. The authority therein contained is especially applicable for the care of victims of war disasters, and this Bureau expects that such authority shall be exercised by Medical Department personnel to the fullest extent in rendering service under the circumstances mentioned to merchant seamen actively engaged in the war effort.

2. It is accordingly directed that naval medical officers on duty in foreign ports, as well as within the continental limits of the United States, shall render all necessary medical assistance to American merchant seamen who are victims of war disasters. No charges shall be made for such services nor for the use of Government facilities or materials.

3. In the event of death of an identified merchant seaman while undergoing treatment by naval medical officers beyond the continental limits of the United States, the nearest American consul should be notified and requested to issue necessary instructions for preparation and disposition of the remains. When death occurs while under treatment by naval medical officers within the continental United States, the local representative of the Public Health Service should be contacted for necessary instructions. The appropriation "Care of the Dead, Navy" is not available for expenditures on behalf of merchant seaman.

4. Instructions concerning admission of merchant seamen to naval hospitals for emergency treatment are contained in reference (c).

ROSS T. McINTIRE

From: The Chief of the Bureau of Medicine and Surgery.
To: All Ships and Stations.

All/P3-4(041)
April 15, 1943

Subject: PATHOLOGICAL MATERIAL, Collection and Shipment of Specimens.

Reference: (a) Paragraph 3331, Manual of the Medical Department,
U.S. Navy, 1939.

1. War has emphasized the pressing need for a clearer understanding of the pathology underlying many medical and surgical conditions produced by modern military and naval operations. These include the changes brought about by the abnormal physiology of flying, injuries induced by air blast and water blast, the renal complications of "crush" syndrome, damage caused by prolonged exposure to the elements, results of prolonged chemotherapy, pathology of tropical or exotic diseases and epidemic diseases of military importance. Autopsy and other pathological material from these and kindred conditions is urgently needed for study.

2. Medical Department personnel attached to Mobile Hospitals, epidemiological and malariological units, hospital ships and other organizations in combat areas or in regions where tropical and exotic diseases exist are particularly well situated to furnish this material. The collection of these specimens at a central depository will enable them to be used for research or teaching purposes and will provide a nucleus for a Museum of War Pathology.

3. It is therefore directed that all activities forward representative, adequately labeled specimens of all autopsies and of pertinent surgical material to the Medical Officer in Command, Naval Medical School, National Naval Medical Center, Bethesda, Maryland.

4. Pathological specimens in adequately labeled containers shall be well packed in wooden or metal cases and addressed "Medical Officer in Command, Naval Medical School, National Naval Medical Center, Bethesda, Maryland". The words "Anatomical Specimens" shall be stenciled or painted on each case. Cases shall be delivered to the local Supply Officer or Master of Ship with instructions to deliver to a Supply Officer at a port of call in the United States for forwarding by express on a Government Bill of Lading.

5. Autopsies should be as complete as possible and blocks should be obtained from all organs. The block should be cut not thicker than 0.5 centimeter and not less than two centimeters square. The simplest fixative is 10% formalin to which a small piece of calcium carbonate has been added. The fluid should be changed once before shipment. Unless the tissue is well fixed before shipping, the volume of the fixative should be ten times that of the tissue.

6. Tissues which are to be studied for protozoa or for inclusion bodies in viral diseases must be fixed in Zenker's fluid or Bouin's fluid. Ten per cent Formalin must not be used.

Preparation of Zenker's fluid:

Mercuric chloride - - - - -	5.0 grams
Potassium bichromate - - - - -	2.5 grams
Distilled water - - - - -	100.0 cc.

Add 5.0 cc. of glacial acetic acid just before using. Remove the tissue in 12 to 24 hours. Wash in water for 12 hours. Mail in 70% alcohol, tinged with iodine. Caution -- do not leave tissue in Zenker's fluid longer than 24 hours.

Preparation of Bouin's fluid:

Commercial formalin - - - - -	15.0 cc.
Saturated aqueous solution picric acid - - - - -	80.0 cc.

Add 5.0 cc. of glacial acetic acid just before using. Remove the tissue in 24 to 48 hours and transfer directly to 50 to 70% alcohol without washing. The alcohol should be changed every 24 hours until there is no further leaching of picric acid. Ship in 70% alcohol.

7. The bottle containing the blocks must be legibly labeled, stating the fixative used, and securely stoppered. It should then be surrounded by cotton and placed in a mailing case. The clinical history and autopsy protocol must accompany the material in the mailing case.

8. Gross specimens intended for the Museum should be fixed, whenever possible, by a method that will preserve the natural colors. Two methods, Kaiserling and the carbon monoxide, are available.

The Kaiserling method:

(a) The tissue is fixed for 3 to 7 days in Kaiserling I, after which it is washed in running water for 12 - 24 hours.

KAISERLING I

Potassium acetate - - - - -	170 grams
Potassium nitrate - - - - -	90 grams
Formaldehyde solution (commercial) - - - - -	1600 cc.
Water - - - - -	8000 cc.

(b) The tissue is placed in 95% alcohol for 6 - 24 hours, or until full development of the natural red color occurs. It is then washed in running water for 2 hours and placed in the final mounting solution, Kaiserling II.

KAISERLING II

Potassium acetate - - - - -	1720 grams
Glycerine - - - - -	2000 cc.
Water - - - - -	10,000 cc.
Phenol - - - - -	20 cc.

The Carbon Monoxide method:

(a) The specimen is fixed for 3 - 7 days in the following solution:

Formaldehyde solution
(commercial) - - - - - 100.0 cc.
Sodium chloride - - - - - 1.1 grams
Sodium bicarbonate - - - - - 1.0 gram
Water - - - - - 1000.0 cc.

(b) After thorough fixation, illuminating gas is bubbled through the solution for 15 minutes each day until a satisfactory color is developed.

(c) The specimen is then transferred to the final mounting solution without washing. This solution is:

Cane sugar - - - - - 40 grams
Chloral hydrate - - - - - 2 grams
Water - - - - - 100 cc.

Kaiserling II may be substituted as the mounting solution. The label attached to the gross specimen should clearly state the fixative used.

L. SHELDON, JR.
Acting